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**Zoological News.**—M. Aug. Lameeré, professor in the University of Brussels, has published <sup>6</sup> a very readable paper on the "Origin of the Vertebrates." He defends and amplifies Sedgwick's well-known hypothesis, and like him derives the vertebrates, and by implication metamerism, from the Actinozoa.

C. Dwight Marsh publishes <sup>7</sup> a list of the deeper water Crustacea in Green Lake, Wis. He enumerates fourteen species, of which a *Bosmina* is new and *Diaptomus minutus* was before known only from Newfoundland.

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## EMBRYOLOGY.<sup>1</sup>

**A New Larval Form from Jamaica.**—The Marine Laboratory of the Johns Hopkins University was situated during the summer of 1891 on the Island of Jamaica, at a point on Kingston Harbor called Port Henderson. While a member of the party I obtained the larva described below. On the morning of June 24th, while examining the tow-stuff from the surface net, Mr. Charles Taylor, of Kingston, discovered the larva. He made a careful sketch of it from the living animal, and it is from this largely that the accompanying figure was subsequently made. The larva was turned over to me, but unfortunately on account of its minute size it was lost during the hardening process, so that all opportunity of a later and fuller examination is gone. Nevertheless, as I am quite sure the figure is accurate as far as it goes, and as the chance of finding another larva is not very good, I have decided to figure it, with a brief account of its capture.

Although there is no record as to the time in the morning when the tow was made, yet in all probability it was between the hours of six and nine A.M. About six or seven o'clock the land breeze that had been blowing during the night ceased, and there was generally a calm interval of an hour or two before the sea breeze (the trade) forced it way

<sup>6</sup> Bulletin Société Belge de Microscopie, XVII., 1891.

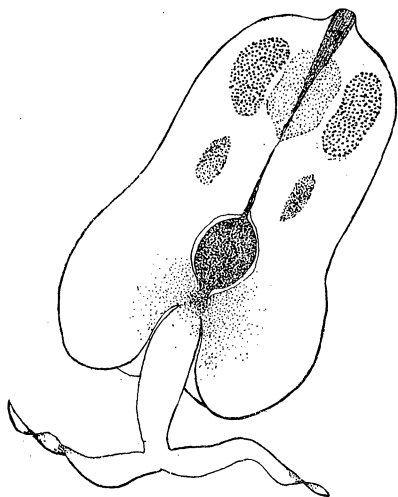
<sup>7</sup> Zool. Anzeiger, XIV., 275, 1891.

<sup>1</sup> Edited by Dr. T. H. Morgan, Bryn Mawr College, Bryn Mawr, Pa.

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inland again. During these calm hours in the morning all the more important collecting was done.

The larva is undoubtedly a free-swimming stage of one of the marine Trematodes. Such pelagic larvæ—Cercaria—are not unknown, but have been now and then recorded by naturalists. The adult worms generally live, I believe, in marine molluscs, and the Cercaria is a larval form seeking a new host. The larva belongs to that division of marine larval Cercaria having bifid tails. Villot says that these Cercaria having split tails form a small very



TREMATODE LARVA.

natural group, and are mostly found parasitic in fresh-water Mollusca; but a few are marine. One of these has been recorded by J. Müller as having been found near Nice, and has been figured in the inaugural thesis of Lavalette Saint-George, under the name of *Cercaria dichotoma*. I have not seen this figure, but judging from the account of the same larva given later by Claparede it is entirely different from the Jamaica larva.

Claparede, in 1863, figured a bifid-tailed Cercaria found in the sea. This is also quite different from the Jamaica Cercaria. The

larva figured by Claparede is called *Bucephalus haimeanus*, and is very close, the author says, to *B. polymorphus*, described by Von Baer, and is the same as that described by Lacaze Duthier which lives in the mollusc *Cardium*. Both of these larva then figured by Von Baer and Lacaze Duthier must be different from the present form.

McCready, in 1873, described a bifid-tailed Cercaria—*Bucephalus cuculus*—living in the American oyster. His figures show at once that the form he described is very different from the Cercaria from Jamaica.

Other descriptions than these I do not know of, and feel reasonably assured that the larva has not been figured before.

The Jamaica larva was a small, jelly-like, transparent body, being, at a guess, about a half a millimeter in length. It moved about quite actively by means of its tail. The latter structure is situated in a groove

on one side of the body, as shown in the figure. At about its middle the tail splits into lamella-like paddles, and it is this divided tail that forms the most interesting feature of the larva. On each side of the anterior end of the larva is a mass of dark granular mass. The other bodies found in the interior of the larva are shown in the accompanying figure.

We never succeeded in getting more of these *Cercaria*, although I looked for them on several occasions.—T. H. MORGAN.

### **Hatschek's Interpretation of the Annelid Trochophore.—**

Zoologists and embryologists have looked forward with a good deal of interest to the publication of the third part of Dr. Berthold Hatschek's "*Lehrbuch der Zoologie*," in which he gives what may be considered the most recent and certainly the most novel treatment of that very heterogeneous group, *Vermes* (*Zygoneura* Hatschek).

More especially interesting is the treatment of the larval form of the Annelids,—the Trochophore. This is ground that Hatschek has himself covered very thoroughly, and his words must carry a great deal of weight along with them, whether his particular view be accepted or not.

"The Trochophore is the characteristic larval form of the *Zygoneura*. In structure, the Rotifers stand very near to the Trochophore, and the Turbellarians which only reach the stage of the Protrochula are very closely related to this last form. In many cases the characteristics of the Trochophore are more or less modified, or even entirely suppressed, as happens in direct development. The primitive type of the Trochophore may be determined by a comparison of those structures that are repeated in very widely separated groups of animals. A complete union of all the typical properties in a single larval form is perhaps never reached, still many Annelid larvæ approach very near to this." A very clear and full description is given of a typical Trochophore. This is illustrated by four new diagrams, that show the structure of the larvæ most excellently.

With respect to the phylogenetic interpretation of the Trochophore the author says: "If we assume as true that the Trochophora is the characteristic form of the *Scolecida*, *Articulata*, *Tentaculata*, and *Mollusca*, we have recognized a common body for all these groups. We may also assume a common descent, and state the law that the *Zygoneura* are derived from a common ancestral form, that has the Trochophora as a stage in the development. Further, we may ask the question whether the Trochophore is itself the repetition of an

ancestral form, and conclude that it is in the highest degree probable, inasmuch as we know several forms of animals which in their mature condition come very near to the Trochophore. Particularly is this true for the Rotifers. The little spherical Rotifer discovered by Semper in the Philippine Islands illustrates most fully this law; and it is to be marked that this is a typical Rotifer, and that at the same time many other Rotifers in spite of their changed outer form possess many true Trochophore characters. On the other hand, it has been affirmed that the Rotifers are sexually mature larvæ of higher forms, and this is not entirely impossible, but it must be remembered that there is no definite evidence for this hypothesis. It is further to be noted that the Turbellarians in their adult condition approach very near to the Protrochula, except that in the adult form ciliated bands are wanting. The view that the inner organization of the Protrochula and Trochophora repeat ancestral characters is made probable by the very similar relations of the organs of the Platodes to the Rotifers. But even the outer arrangement of cilia of the Trochophore may in all probability be considered as an ancestral character, since it is found to some extent not only in the Rotifers but in other groups as well,—viz., in the Entoprocta and the Tentaculata as definite structures in the adult organization.

“We may thus formulate the following law: The Protrochula is a repetition of the Protrochozoon,—*i.e.*, the common ancestral form of all Zygoneura. The Trochophora is the repetition of the Trochozoon,—*i.e.*, the common ancestor of all the Zygoneura standing above the Platodes. The organization of the Scolecida is referred directly back to the organs of the Protrochula and Trochophora. This applies to the nervous system, digestive tract, muscles, and the proto-nephridia, but not to the gonads, which appear primitively paired in the Scolecida, and have the structure of sac-gonads with peculiar excretory tubes. Concerning the development of these there are few observations, but it is probable that the sac-gonads and the gonad ducts (*viz.*, egg-tubes and sperm-tubes) are of mesodermal origin, and represent cœlomatous formations.

“Kleinenberg has attempted to derive the Trochophore from the *Medusa form*, comparing the preoral ring-nerve of the Annelid larva with the ring-nerve of the Hydromedusæ. This hypothesis is scarcely in accord with the rest of the organization. There is much better grounds for the belief that the Ctenophores stand very near to the Zygoneura. The sense-organ plate at the apical pole, the mesenchymatous musculature and the ectodermal œsophagus appear to be

related structures, also the ciliated apparatus of the Ctenophore may be compared with the preoral ciliated band of the Trochophora. We would assume that the coelom sacs and nephridial canals of the *Zygoneura* (sac-gonads of the *Scolecida*) are derived from the gastric canals of the Ctenophores, and therefore that the mid-gut of all *Zygoneura* may be compared morphologically only with the central stomach of the Coelenterates in general and the Ctenophores in particular, and not with the whole primitive digestive system of coelenteric apparatus, as Lang has done."

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## ENTOMOLOGY.<sup>1</sup>

**"Biological Papers."**—With this general title Prof. Charles Robertson, of Carlinville, Illinois, has recently distributed, under one cover, a series of admirable papers on flowers and insects, and descriptions of North America Hymenoptera. In his studies of the former subject the author has followed closely along the lines laid down by Müller in his "Fertilization of Flowers," describing the structural peculiarities of the blossom of each plant considered, and the relative time of development of each part, and cataloguing both the species of insect visitors and the object of their visit. The length of these catalogues indicates an amount of careful field work which will be best appreciated by those who have tried it.

**Lepidoptera of Buffalo.**—The last number of the Bulletin of the Buffalo Society of Natural History contains an excellent "List of Macro-Lepidoptera of Buffalo and Vicinity" by Edward P. Van Duzee. In its preparation the author has been assisted by Dr. D. S. Kellicott, Mr. A. H. Kilman, Mr. Philip Fisher, and other members of the society. The list includes the Geometridæ and Pyralidæ, but omits the Tortricidæ and Tineidæ. The total number of species is 777, of which 361 are Noctuidæ. The same issue of the Bulletin contains an account of "Mill's Collection of Fresh-Water Sponges," by Dr. Kellicott.

**Kerosene Emulsion.**—In Bulletin No. 16 of the Michigan Experiment Station Prof. A. J. Cook discusses "Kerosene Emulsion and Its Uses." The article is evidently the result of a large amount of careful experimentation of the highest practical value, in which the

<sup>1</sup> Edited by Prof. C. M. Weed, Hanover, N. H.